# Middle Pleistocene Fan 2 Play
## MPL F2, #0582
### *Angulogerina* "B"

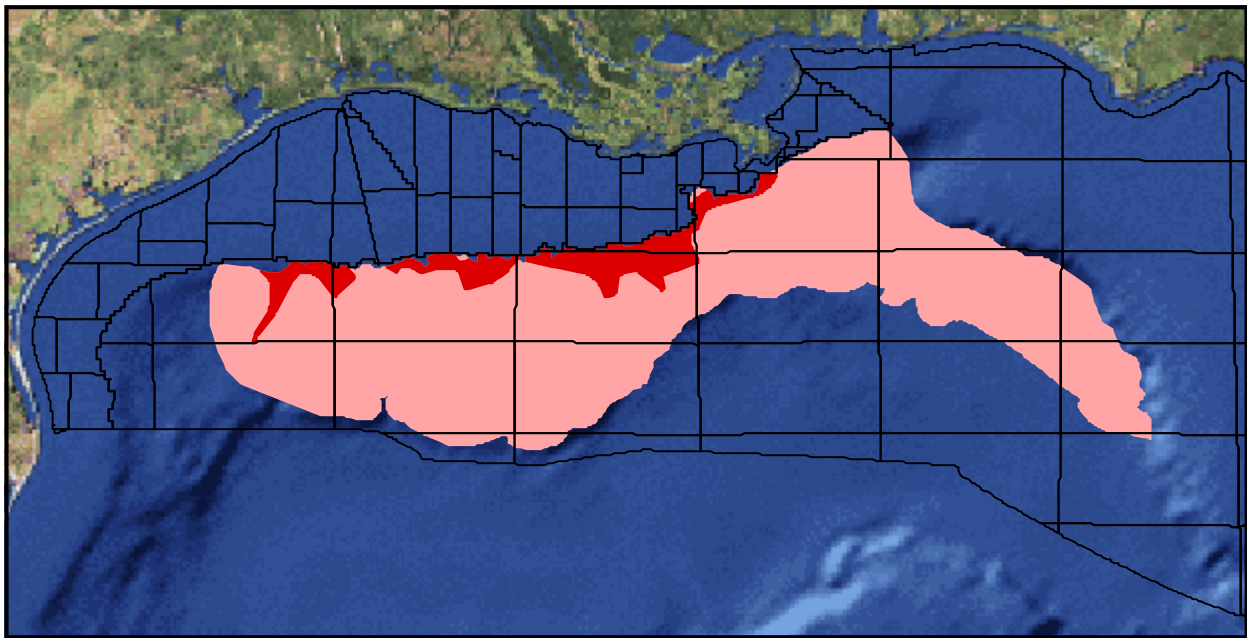

*Figure 148. MPL F2 map showing location of play. Play limit shown in light red; hydrocarbon limit shown in dark red.*

## Overview

The Middle Pleistocene Fan 2 Play (MPL F2) contains reserves of 1,129.285 Bcfg and 108.374 MMbo (309.314 MMBOE) in 61 sands in 23 fields. The play extends continuously across the modern GOM slope from the East Breaks and Alaminos Canyon to Destin Dome and Desoto Canyon Areas, and to the south and east of the Desoto Canyon Area to the Henderson and Vernon Basin Areas (Figure 148).

## Description

MPL F2 is defined by (1) a deep-sea fan depositional style representing sediments deposited basinward of the MPL shelf edge, (2) a structural regime of allochthonous, small salt sheets or large salt canopies with intervening salt-withdrawal basins on the western and central GOM slope and high relief salt structures on the southeastern GOM slope, and (3) the MPL-1 and MPL-2 Chronozones, the tops of which are defined by the *Angulogerina* "B" 2nd occurrence and *Angulogerina* "B" 1st occurrence biozones, respectively (Figure 8).

MPL F2 extends in a continuously downdip of the modern GOM shelf edge from the central East Breaks and Alaminos Canyon Areas to the southwestern Destin Dome and western Desoto Canyon Areas east of the modern Mississippi River Delta, and south and east of the Desoto Canyon Area to the Henderson and Vernon Basin Areas (Figure 148). Hydrocarbons have been found mostly in the eastern East Breaks, northern Garden Banks and Green Canyon, Ewing Bank, and northwestern Mississippi Canyon Areas. Located on the modern GOM slope, MPL F2 is not nearly as well explored as plays on the modern shelf. However, because it is one of the shallowest plays in the deepwater GOM, exploratory wells in deepwater usually penetrate MPL F2. The ancestral Mississippi River Delta System dominated deposition of the play's sediments.

## Play Limits

MPL F2 is limited updip by the Middle Pleistocene Fan 1 Play (MPL F1) and by the deposits of the Middle Pleistocene Progradational Play (MPL P1). MPL F2 does not extend farther to the west

because of an apparent lack of shelf source sands in offshore Texas during MPL time. To the east, the play onlaps the lower Cretaceous carbonate slope. Downdip in the western and central GOM, MPL F2 is limited by the farther downdip occurrence of either (1) the Sigsbee Salt Canopy Escarpment, where the farthest extent of large salt bodies overrides the abyssal plain or (2) the downdip limit of the Perdido Fold Belt and Mississippi Fan Fold Belt Plays. Downdip in the eastern GOM, MPL F2 is limited by the southern extent of Louann Salt deposition, as defined by the downdip extent of the Salt Roller/High-Relief Salt Structure Play (UK5-UJ4 S1) (Lore et al., 2001).

## Depositional Style

MPL F2 is characterized by deep-sea fan systems deposited basinward of the MPL-1 shelf edge, the farthest updip shelf edge associated with the MPL Chronozone. Component facies include channel/levee complexes, sheet-sand lobes, interlobe/fringe sediments, and slump sediments that were deposited on the MPL-1 and MPL-2 upper and lower slopes, in topographically low areas between salt structure highs, and abyssal plains. These deep-sea fan systems are often overlain by thick shale intervals representative of zones of sand bypass on the shelf, or sand-poor zones on the slope.

The MPL deep-sea fan interval varies from less than 50 to more than 5,400 ft in thickness, with net sand thicknesses as much as approximately 1,100 ft. Sand-dominated successions comprising deposits of multiple sheet-sand lobes are more than 1,000 ft thick, with intervening shale sequences reaching as much as several thousands of feet in thickness. Thick, upward-coarsening and thinner, upward-fining log patterns of sand-dominated intervals represent sheet-sand lobe progradation and channel fill/abandonment, respectively, in proximal-fan areas. Irregularly stratified sand successions displaying spiky log patterns suggest deposition in distal-fan areas.

## Structural Style

Over half of the fields in MPL F2 are structurally associated with salt bodies, mostly of intermediate and deep depths, with hydrocarbons trapped on salt flanks or in sediments draped over salt. Other fields are structurally associated with anticlines and normal faults, while some fields contain hydrocarbon accumulations trapped by permeability barriers and updip pinchouts or facies changes.

## Quantitative Attributes

On the basis of reserves calculations, MPL F2 is 65% gas and 35% oil. The 61 sands in the play comprise 87 reservoirs, of which 36 are nonassociated gas, 50 are undersaturated oil, and 1 is saturated oil. Proved reserves are estimated at 969.123 Bcfg and 86.863 MMbo (259.305 MMBOE) in 49 sands in 18 fields (Table 67). Unproved reserves are estimated at 160.162 Bcfg and 21.511 MMbo (50.010 MMBOE) in 12 sands in 5 fields. These proved plus unproved reserves account for only 9% of the reserves for the MPL Chronozone.

| | No. of Sands | Oil (MMbbl) | Gas (Bcf) | BOE (MMbbl) |
|---|---|---|---|---|
| Proved | 49 | 86.863 | 969.123 | 259.305 |
| Cum. production | 39 | 50.332 | 495.633 | 138.523 |
| Remaining proved | 41 | 36.531 | 473.489 | 120.781 |
| Unproved | 12 | 21.511 | 160.162 | 50.010 |

*Table 67. MPL F2 reserves and cumulative production.*

Cumulative production from MPL F2 totals 495.633 Bcfg and 50.332 MMbo (138.523 MMBOE) from 39 sands in 17 fields. MPL F2 production accounts for only 5% of the MPL Chronozone's total production. Remaining proved reserves in the play are 473.489 Bcfg and 36.531 MMbo (120.781 MMBOE) in 41 sands in 16 fields.

Table 68 summarizes that water depths of the fields in MPL F2 range from 663-2,953 ft, and play interval discovery depths vary from 4,414-16,400 ft, subsea. Additionally, porosity and water saturation range from 21-36% and 16-60%, respectively.

| 61 Sands | Min | Mean | Max |
|---|---|---|---|
| Water depth (ft) | 663 | 1,350 | 2,953 |
| Subsea depth (ft) | 4,414 | 10,359 | 16,400 |
| Reservoirs per sand | 1 | 1 | 4 |
| Porosity | 21% | 30% | 36% |
| Water saturation | 16% | 30% | 60% |

*Table 68. MPL F2 sand attributes. Values are volume-weighted averages of individual reservoir attributes.*

## Exploration History

MPL F2 has a 24-year history of discoveries, which is relatively short when compared with plays located on the modern shelf (Figure 149). The first

sand in the play was discovered in 1975 in the Mississippi Canyon 148 Field. The maximum number of sands discovered in any year occurred in 1989 with 10 sands from five fields. However, the maximum yearly reserves of 50.877 MMBOE were added in 1979 with the discovery of 3 sands from three fields. Sand discoveries throughout the play's history average about 3 per year.

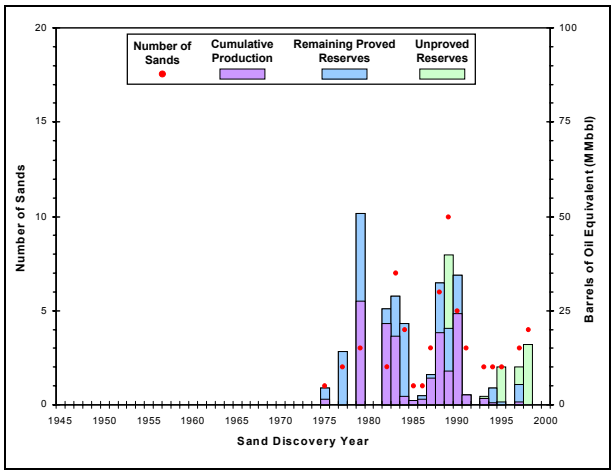


*Figure 149. MPL F2 exploration history graph showing reserves and number of sands discovered by year.*

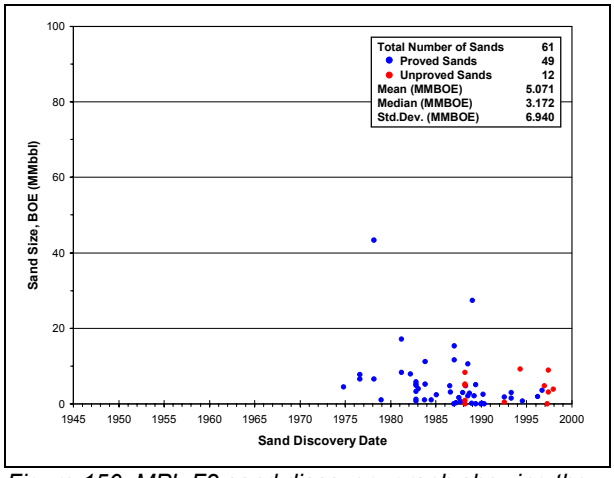


*Figure 150. MPL F2 sand discovery graph showing the size of sands discovered by year.*

The largest sand in the play was discovered in 1979 in the Mississippi Canyon 354 Field (Zinc) and contains an estimated 43.330 MMBOE (Figure 150). Only one other sand contains more than 25 MMBOE, and it was discovered in the Garden Banks 236 Field (Pimento) in 1990. The mean sand size for the play is 5.071 MMBOE. Since the first Atlas database cutoff of January 1, 1995, 9 sands have been discovered, the largest of which is estimated to contain 9.288 MMBOE in the Green Canyon 158 Field (Brutus).

## Production History

MPL F2 has a 13-year history of production (Figure 151). Oil production began in 1987 and has fluctuated throughout the play's history, peaking in 1997. Gas production began in 1986 and has generally increased throughout the play's history, reaching its highest levels in 1995 through 1998.

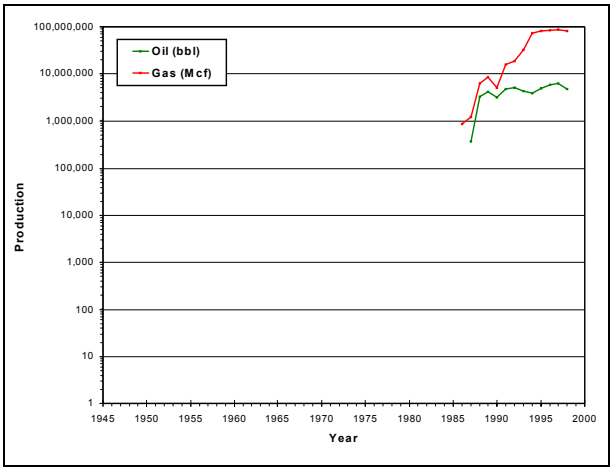


*Figure 151. MPL F2 production graph showing oil and gas production by year.*